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(54) Title: APPARATUS AND METHOD FOR NEUROSURGICAL STEREOTACTIC PROCEDURES		
(57) Abstract		
<p>An apparatus and method are disclosed for displaying a path between a selected target and selected points on a patient's skull and for guiding surgical instruments along any selected path. The system (10) is comprised of an image display system (12), an articulated arm and probe (18), and a stereotactic system (16). The sub-systems are coupled to one another so that the articulated probe (18) may be used to select patient fiducial points that correspond to selected image fiducial points. Using these points, the image display system (12) coregisters the external locations to the displayed images so that the probe condition may be displayed with the displayed images. The system (10) further permits the identification of a selected target (T) within a patient's brain and to project a path from the external position to the target prior to the performance of a craniotomy. After evaluation of the path, a surgeon may lock the stereotactic system (16) in place to preserve a selected surgical path and to guide instruments along that path. A method of utilizing the system to perform such surgical procedures is also described.</p>		

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INTERNATIONAL SEARCH REPORT

Internat Application No
PCT/US 95/12587

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61B19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US,A,5 230 623 (GUTHRIE ET AL.) 27 July 1993 see column 3, line 14 - column 4, line 9 ---	1,17,27, 28
A	WO,A,88 09151 (SCHLÖNDORFF) 1 December 1988 see claim 1 ---	1,17,27, 28
A	EP,A,0 427 358 (ALLEN ET AL.) 15 May 1991 cited in the application see claim 1 ---	1,17,27, 28
A	US,A,5 279 309 (TAYLOR ET AL.) 18 January 1994 see claim 1 ---	1,17,27, 28
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

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- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

15 March 1996

Date of mailing of the international search report

25.03.96

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INTERNATIONAL SEARCH REPORT

Internat Application No

PCT/US 95/12587

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US,A,4 805 615 (CAROL) 21 February 1989 cited in the application see claim 1 -----	1,17,27, 28

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INTERNATIONAL SEARCH REPORT

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: 13-16 because they relate to subject matter not required to be searched by this Authority, namely:
Please see Rule 39.1(iv) PCT.
2. Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internal Application No

PCT/US 95/12587

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US-A-5230623	27-07-93	NONE		

WO-A-8809151	01-12-88	CA-B-	1336923	05-09-95
		DE-A-	3717871	22-12-88
		AU-B-	621053	05-03-92
		AU-B-	1805688	21-12-88
		DE-D-	3884800	11-11-93
		EP-A,B	0359773	28-03-90
		US-A-	5186174	16-02-93
		CA-A-	1325850	04-01-94
		US-A-	5494034	27-02-96

EP-A-427358	15-05-91	AU-B-	664863	07-12-95
		AU-B-	2745192	17-12-92
		AU-B-	632633	07-01-93
		AU-B-	6590790	16-05-91
		CA-A-	2029401	09-05-91
		EP-A-	0647428	12-04-95
		JP-A-	3168139	19-07-91
		US-A-	5142930	01-09-92
		US-A-	5230338	27-07-93

US-A-5279309	18-01-94	US-A-	5445166	29-08-95
		US-A-	5402801	04-04-95

US-A-4805615	21-02-89	AU-B-	5948786	08-01-87
		CA-A-	1278969	15-01-91
		EP-A-	0207452	07-01-87
		JP-A-	62038147	19-02-87
		US-A-	4955891	11-09-90
